GARDEN AND FOREST.

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The Care of Newly Planted Trees.

IN this latitude most of the tree-planting for the spring is now over, and, no doubt, much of it has been improperly done, which means that a great amount of money and labor has been wasted. And yet, even where properly selected trees have been planted in the most approved manner, it should never be forgotten that they are not likely to reach their best estate unless they receive constant care hereafter. The first season in the life of a transplanted tree is its most critical period. After this it will be better able to take care of itself, although there never will be a time in all its history when it will not be stronger and more beautiful for intelligent attention to its wants. Prizes are now offered in some states to those children of the public schools who plant the greatest number of trees on Arbor Day. It would be better if such prizes were given to those who plant the best trees in the best manner, and still better yet if a prize was offered, to be awarded some five or ten years later, to the child who had reared the best tree. The simple planting of a great number of trees has little educational value. If they are badly planted the lesson is worse than useless, but thoughtful and devoted attention given to a growing tree for half a dozen years would bring an experimental knowledge of the methods of plant-life and of the means of circumventing a plant's enemies, which would be invaluable in all future practice of this sort.

In the first place, newly planted deciduous trees, unless they are very small, need to be kept in place so that they cannot sway about in the wind to such a degree that the roots are loosened and separated from that intimate contact with the soil which is essential to their growth. To prevent this, a stout stake should generally be driven firmly in the ground and close to the stem. The tree should be fastened to this stake with some soft material like strips of canvas or bast, for cord, wire or other sharp material would cut the bark. The attachments should be made from a point two or three feet above the ground up to the top of the stem, and for this reason, and to prevent the injury of the trunk by rubbing against the end of the stake, this should be as tall as the tree. Exposure of the bare wood of a tree brought about by pruning or by abrasion of the bark is always dangerous. There are many fungi causing diseases of trees which enter through the leaves and buds and tender twigs, but the most common ones are those which attack open wounds and never grow on healthy bark. Whenever such a raw surface is made it should at once be covered over with coal-tar or some such substance to prevent the punk fungi and others, which cause decay, from getting a lodgment and carrying death into the trunk.

Again, all the nourishment of the tree must be diluted in water and carried up through the roots. Moisture is therefore essential at the roots, and every means should be taken to preserve what is in the ground, especially when the weather becomes dry. All grass and weeds about the trunk should be kept down, inasmuch as they rob the tree of the food which belongs to it. Frequent stirring of the surface is a good practice, for this breaks the continuity of the capillary tubes which form as the ground hardens, and the layer of loose soil acts as a mulch to prevent evaporation from the surface. Mulching itself, with any kind of litter, is always in order. As the season advances, the growth of the trees should be carefully watched. If vigorous shoots and bright, abundant leaves are formed, this shows that the tree has made good roots, and that these roots are doing their duty. If there is stunted growth and insufficient foliage this is a warning that the roots are small and feeble, and that they probably need moisture. It is sometimes a good plan to shade the trunks, especially on the south side, and it is often advisable to wrap them with straw-rope or other material, to check evaporation. This is especially true of large trees when the bark looks dry and shows signs of loosening. In such cases it is advisable to moisten the trunk with water.

As the season wears on it will be found that each species of tree invites the attack of particular insects, which assail it in every part. A great amount of knowledge concerning these pests and their habits has been accumulated during recent years by patient study, so that we now know how most of the borers, and girdlers and defoliators do their work, and we have learned, too, in most cases, how to repel their attacks. Science has rendered no more important aid to horticulture and agriculture during the last few years than it has in the discovery of insecticides, and the most effective ways of using them at the proper time and place. With the teachings of the new literature on that subject every one who successfully cares for trees must become familiar. The methods of warring against these various enemies have been given from time to time in GARDEN AND FOREST, as experience has proved their value, and the bulletins of the experiment stations and of the Department of Agriculture of the general government furnish all the information necessary on this subject.

But, after all this, something more is needed. Even if a tree is well fed and kept in health and free from enemies it still requires the guiding hand of man if it is to assume its best form. Much useful pruning in the summer-time can be done by simply rubbing away the leaf-buds and by pinching off the young shoots with the thumb and finger. Some branch may start out with an excess of vigor which threatens to destroy the symmetry of the head, and it needs checking. Another branch which is not needed may be chafing against one which cannot be spared, and the useless one can be removed while it is small without any check to the vital force of the tree. Nature may replace the broken leader of a conifer by two leaders of equal strength, so that the trunk is divided into two stems of nearly equal size, and then the tree will have little value for ornament or timber. If one of these is removed at the outset a straight single trunk will be produced, and what promises to be a misshapen tree will soon be a good one.

All this requires attention and study, but it is study well directed, and study which no one who aims to make the most of his opportunities can afford to neglect. After mid-August the stirring of the soil about many trees should cease, for this may encourage a late sappy growth, which will not be properly matured when winter sets in. Later on, the mulch should be examined, and anything which is liable to harbor field-mice should be removed or exchanged, and all through the winter the trunks should be guarded against the teeth of these marauders. As the tree grows, especially if it is on the street, its trunk should be guarded against the gnawing of horses and other injuries, and supervision against such dangers should be unremitting throughout its entire life. Trees which have been planted in large excavations which were filled with good soil, will usually make a good growth, but an occasional top-dressing in the autumn over the roots with loam mixed with well-decomposed manure will never fail to show a good effect, and in the case of fruit-trees a dressing of some form of potash and phosphoric acid is indispensable. In forests the leaves which contain much mineral matter remain on the surface to decompose to the permanent enrichment of the land, but where all these are removed some food must be supplied to take their place if the greatest vigor and beauty are expected. Any one who examines a tree which stands in deep rich bottom-land, and then compares it with another of the same kind which has struggled along on a hungry ridge of gravel, will see a striking difference. What the planter wants is not something which bears the name of a tree, but the best of its kind, a specimen thrifty and strong and displaying all the luxuriance and beauty of which its kind is capable.

Two or three weeks ago we reviewed a paper by Mr. Henry Gannett, in which he claims that our forests are producing timber much faster than we use it; that the woodland is steadily spreading over the farm-land, and that a wise economy dictates the burning of more wood to save our coal and the use of more timber in construction to save our iron ore. Mr. Gannett reached his conclusion by adding up some more or less untrustworthy estimates of the wooded area of various parts of the country, which brought the sum total to considerably more than 700,000,000 acres. He then assumed the annual wood product of an average acre to be forty cubic feet, and arrived at his statistics by a simple multiplication.

Unfortunately there are no reliable data to oppose to anybody's guesses, and so the best that can be done is to show that Mr. Gannett's guesses are worthless. His paper came into the hands of Mr. B. E. Fernow, Chief of the Division of Forestry, just as he was leaving the country, and he wrote from the steamer a brief letter to the Secretary of Agriculture, which has now been published. In this letter it is stated that Mr. Gannett's estimate of the forest-area is probably more than two hundred million acres too large, although in some former papers his estimate of the same area was thirty-three and one-third per cent. higher than it now is. It is shown, also, that forty cubic feet of wood, that is, such wood as goes to make up the timber and fuel used in the United States, is absurdly large for the annual product of an acre. The fact is, that the conjectures of Mr. Gannett are utterly without value, except in so far as they excite discussion, and in this way bring out the truth from other sources.

New England Parks.

PUTNAM'S WOLF-DEN, POMFRET, CONNECTICUT.

AMONG the beautiful and historic places of New England the site of Old Put's Wolf-den holds a prominent place, and it is gratifying to learn that $5,000 has recently been appropriated by the State Legislature of Connecticut for its purchase. The spot itself is picturesque in a marked degree, and its rescue is timely. Already the fine woods in its neighborhood are falling before the axe, and only this prompt action will prevent the ruin of one of the most interesting sites in the state; for, once cut down, the forests would be slow to start again upon that craggy hill-side, and the charm of the spot would be destroyed.

The old town of Pomfret is situated among the hills of Windham County, in the north-east corner of Connecticut, where the country is so rolling that the distant villages are often visible to one another, each perched with its white spire upon its own high hill and commanding an extended prospect. The fine air, the beautiful sites for country-seats on the elevations, the extended views, make of the village a summer resort whose attractions have long been recognized by New York and Boston and Providence people.

Deep valleys lie between the uplands. One of them is the valley of the Quinebaug River, which winds its rushing way, turning the wheels of many a great manufactory, until it changes its name and merges itself into the Thames at Norwich and New London, and bears our navies on its broad bosom. But from the hills of Pomfret only a morning mist reveals the course of the swift flowing little river which turns the mill-wheels of the thriving town of Putnam, a borough composed of pieces from four contiguous towns, and made important by the railroads which centre there and by the cotton industry which thrives along the brisk river.

Pomfret itself is without a water view, except for a merry brook here and there, but there is great beauty in the spacious landscape viewed from its elevations. It lies about a thousand feet above the level of the sea, and there is a dry and vigorous quality in its keen air. The far-off horizons, the undulations of the surface, the masses of woods, the soft sweeps of hills crowned with country houses surrounded by smooth lawns and tasteful groups of trees, and fertile fields stretching away between the rises, give a fine sense of space and freedom to the landscape. Until the presence of summer residents established a colony upon the hill near the old meeting-house and great boarding-houses arose, with all the appliances necessary for the comfort and amusement of hundreds of visitors, there was no clustered village, but only a long street, turning two sharp corners toward the centre of the town, which was bordered by widely separated old-fashioned houses, with farms around and behind them. Outside of this, long, hilly roads led, as they still do, to other scattered and distant farms, occupied by the inhabitants, to whom they have descended by inheritance through many generations, one straggling village melting into another, until it is hard to tell where one ends and another begins. A solitary country store, in which the post-office is usually kept, has been from time immemorial the sole mercantile establishment of the community.

Israel Putnam was born in Pomfret, but the house he died in is now in the adjoining town of Brooklyn, both houses situated nine miles or so from Pomfret church. Over these hilly roads the General came, riding, many a time to see his old friend, Ebenezer Grosvenor, whose son married his daughter Eunice, for ten miles was not much of a circumstance in those vigorous days, and the remote ends of Pomfret were on more intimate visiting terms with each other than they are at present. These Grosvenor houses, much improved and enlarged by succeeding generations of occupants, are still standing on adjoining lots near the store, the one in which Eunice Putnam ended her days being still the property of her granddaughter.

The wolf-den which was the scene of that exploit of young Putnam so dear to schoolboy hearts, and which was the first illustrious deed of the gallant youth who was ultimately to be the senior Major-General of the United States Army, is situated on the eastern slope of a high and rocky hill overgrown with ancient Chestnuts which rises in the southern extremity of Pomfret. The climb to it by one road is long and steep, but there is a more level approach to it from another direction. Both approaches lead through sparsely settled regions, and the entrance to the field is merely a break in the line of tumbling down stone-fence, where some bars indicate a cart-path. Leaving his carriage outside, for the ground within is uncomfortably broken and rocky, the visitor strolls along a rough wood road till the path narrows and grows steep and slippery as it descends the sharp incline upon the eastern face of the hill. Here on every hand are mighty boulders of strange shapes, many of them pointed like the prows of ships, with summits overhanging their base, others tumbled in wild confusion over the surface of the ground. In autumn, through the naked branches, you see the blue valley below and catch a glimpse of the opposite hill beyond it. The sound of the distant wood-cutter's axe rings through the still air, but no other murmur of life is audible. The stones are gray and mossy with age; the trees are of primitive growth, not of great girth, for the rocky surface from which they spring affords

small nourishment, and those that lie where they have fallen, hollow and dead of old age, are no larger. But the wood is of good height, and not a coppice growth. The trees are almost all Chestnuts, with rugged moss-grown trunks.

As you look carefully to your footsteps on the rough and slippery path, you are suddenly aware, upon your left, of a black cavern among the boulders, large enough to admit the body of a man. Huge rocks are piled around and above it, shamefully disfigured with the names of those who have visited the spot, but there the little opening shows the scene of the gallant deed of the young farmer, who alone, torch in hand, explored its narrow recesses and shot the old she wolf in her lair (see p. 217). The wolf-den is said to be not more than thirty-five or forty feet deep, though it merges into a narrow winding passage that, descending sharply, is believed to penetrate into the heart of the hill. It is a tight squeeze for a man to enter the cavern, and I have never seen any one penetrate more than a few feet into its slimy recesses; but it is said to slope downward at a sharp angle, so that a careful explorer may advance thence on hands and knees. Ten or twenty feet further on the passage makes a bend and opens into a chamber fifteen feet or more in diameter, the ceiling not more than four feet high; this was the lair of the historic wolf. These proportions are possibly traditional, for I never knew of any one but a small boy entering, who, dismayed at the report that rattlesnakes were the present denizens of that grewsome abode, promptly retired without much definite information. It is probable that the whole opening has settled since Putnam's time, so that penetrating the cave would now be more difficult than ever; but when the authorities are fairly in possession it may be that some excavation of this subterraneous chamber will be attempted, and make it possible for youthful visitors to see for themselves the den where Putnam fired at the glaring eyeballs of the enemy nearly one hundred and seventy-five years ago. The reverberation of his gun in the cavern deafened him completely in one ear, and in his later life he became almost totally deaf.

Very old trees are growing out of the rocks above the cavern, where the harsh and stony soil limits their development, and all around spring Ferns and Mosses and wild-growing things that would make the spot charming, but for the hideous disfigurement of the painted names which hopelessly vulgarize the scene. The first duty of the Park Commissioners who are appointed will be to prohibit such desecration of the place, and they will, of course, do their best to efface these evidences of barbarism. It is proposed to lay out gravel walks and to remove the underbrush in the enclosure, but it is to be hoped that the latter process will be performed with great care, for in a long, undisturbed forest of this kind, any meddling with existing conditions, other than to remove the dead growth, might result in serious detriment to the trees. The woodland undergrowth is necessary to the well-being of old trees, and its removal helps to rob the roots of moisture and admits too much air and sun upon the unaccustomed trunks. A better path might well be made, but it will be a pity to interfere with the picturesque wildness of the place more than is absolutely necessary. What is of most importance is to purchase as much of the wild woodland in the neighborhood as the appropriation made by the state will admit of, and to preserve it intact, that the beauty of the hill, with its historic cavern, may be perpetually maintained.

Already the fine woods, which have been one of the charms of Pomfret, are failing to meet the demand for lumber, and the older inhabitants hear with a pang the echo of the axe telling of the ruin to come, when their mantle of green is stripped from these windy hills. It has been with terror that the lovers of the spot have listened to the approaching axe and feared that even this historic spot would not be spared. Fortunately, the old boulders about the den, clothed to their shaggy tops with verdure and overhung with ancient Chestnuts, cannot be destroyed, and they will be associated forever with that picturesque figure in history, who, from the slaying of the wolf, continued to be a doer of gallant deeds. Whether leaving his plow in the field to gallop to the Lexington fight, or sharing with Prescott the honors of Bunker Hill battle, or galloping down the hundred steps of Break-neck Hill, with British bullets flying through his hat, and British soldiers admiring his plucky ride for life and freedom, Israel Putnam is always a spirited figure in the historic page, a gallant fighter, a sturdy patriot, a prompt and decisive actor in every good cause.

His lineal descendants still till the Pomfret soil and preserve the traditions of the race with cheerful courage and ready helpfulness. To them, as to the whole town, it is a cause of rejoicing that the old wolf-den will be forever guarded from destructive hands, and made an object of honor to the state and a perpetual lesson to its children who shall come hither to learn at the scene of his boyish exploit, the story of the old patriot general of the Revolution.

Hingham, Mass. *M. C. Robbins.*

Notes on the Forest Flora of Japan.—XIII.

THE Japanese form of the Old World Mountain Ash, Pyrus aucuparia, is a common tree in Yezo and on all the high mountain-ranges of Hondo, where it is sometimes twenty or thirty feet in height, and always conspicuous in autumn from the brilliant orange and scarlet colors of the foliage. This peculiarity will give to this tree a horticultural value, although, except in its mostly glabrous buds, it does not vary in any marked way from the Mountain Ash of Europe and northern Asia.

Pyrus sambucifolia, which is much like the American plant, although described as a small shrub, is said to be abundant in northern and eastern Yezo and on the Kurile Islands. I only saw it in the botanic garden at Sapparo, where Professor Miyabe has established a remarkable collection of Hokkaido plants. The third Japanese Mountain Ash, Pyrus gracilis, is, I believe, unknown in cultivation; it is a particularly well-marked species with woolly buds, leaves only four or five inches long with oval or oblong leaflets rounded or acute at the apex, and pale on the lower surface, orbicular, incisely serrate stipules an inch or more across, minute flowers in small few-flowered clusters, and oblong fruit barely an eighth of an inch long. Pyrus gracilis inhabits mountain-forests in Kyūshū and in central Hondo, where, however, I looked for it in vain.

Aria is represented in Japan by two handsome trees, the first, Pyrus lanata* (I follow Hooker in the *Flora of British India* in referring the Japanese plant to the Pyrus lanata of Don, which grows also on the Himalayas from Cashmere to Kumaon), is not rare in central Japan, where it is principally found at about 5,000 feet elevation above the sea-level on the lower edge of the great Hemlock-forest. Here it is a tree thirty or forty feet in height, with a trunk six to eight inches in diameter, slender light red branchlets marked with white dots and oblong obtuse winter-buds covered with pale chestnut-colored imbricated scales. The leaves are three or four inches long, two or three inches wide, broadly oblong to ovate-lanceolate, acute at the apex, slightly lobulate and serrate, dark green and mostly glabrous on the upper surface, and silver-white and more or less thickly coated with tomentum on the lower. The flowers I have not seen, but the fruit is subglobose to oblong, one-third of an inch long, bright scarlet and marked with pale lenticels. The second Japanese species of Aria is a tree fifty or sixty feet in height, with a trunk covered with pale smooth bark, and occasionally a foot and a half in diameter, slender branches, which form a narrow oblong head, and red branchlets marked by oblong lenticular dots. The leaves are ovate, acute, often long-pointed at the apex, rounded or sometimes wedge-shaped at the base, serrate, with incurved teeth, or often coarsely and doubly serrate above the middle, thin, or subcoriaceous at maturity, dark green on the upper surface, pale on the lower, two or three inches long and one or two inches broad, with thick prominent midribs, straight parallel veins and slender petioles one or two inches in length. The flowers, which appear near Sapparo early in June, are borne in loose spreading long-branched, few-flowered corymbs, and are half an inch in diameter. The calyx-lobes are ovate, acute, densely coated on the inner surface with thick white tomentum, and much shorter than the oblong white petals rounded at the apex and contracted at the base into short claws more or less covered with tufts of long white hairs. The stamens are exserted, with filiform filaments enlarged at the base, and rather longer than the two spreading styles. The fruit ripens in September, and is oblong or subglobose, the size of a pea, light red, and conspicuously marked by the

* Pyrus lanata, Don, *Prodr. Fl. Nepal.* 237 (1802).—Hooker f., *Fl. Brit. Ind.*, ii., 375. Sorbus Aria, var. Kamaonensis, Maximowicz, *Mél. Biol.*, ix., 173 (1873). Sorbus lanata, Wenzig, *Linnæa*, xxxviii., 61 (1874).

scar left by the deciduous calyx. Unfortunately the name Pyrus alnifolia which has been given to this tree is not applicable, it having been previously applied to an entirely different plant, Amelanchier alnifolia, by Sprengel in 1825, and as a new name must be found for it, I am glad of the opportunity of associating with this fine tree that of Professor Kingo Miyabe, whose knowledge of the flora of Hokkaido is unrivaled. Pyrus Miyabei * is one of the common trees of the forests of central Yezo, and, according to Maximowicz, it inhabits the province of Nambu, in Hondo, and southern Manchuria. So far as I know, it has not been introduced into our gardens, where it may be expected to flourish.

Of true Apple-trees there is apparently only a single indigenous species in Japan, the Pyrus Toringo of Siebold. This is the tree which is often cultivated in American and European gardens as Pyrus Malus floribunda, Pyrus microcarpa, Pyrus Parkmani, Pyrus Halleana, Pyrus Sieboldii and Pyrus Ringo. It is a common and widely distributed plant in Japan, growing from the sea-level in Yezo to elevations of several thousand feet in central Hondo, usually in moist ground in the neighborhood of streams. Sometimes it is a low bush, but more often a tree fifteen to thirty feet in height, with a short stout trunk and spreading branches. The leaves are exceedingly variable, and on the same plant are often oblong, rounded or acute at the apex, or broadly ovate or more or less deeply three-lobed. The fruit, which, like that of the Siberian Pyrus baccata, loses the calyx before it is fully ripe, resembles a pea in size and shape, and in color varies from bright scarlet to yellow. In early spring Pyrus Toringo is one of the most beautiful of the trees found in our gardens, where it is perfectly hardy, and where it covers itself every year with fragrant pink or red single or semi-double flowers.

Pyrus Sinensis, the common cultivated Pear-tree of Japan, although now growing spontaneously in some mountain regions, is probably a native of northern China and Manchuria; and of an indigenous Pear-tree, of which we obtained a supply of seeds in the forests of the Nikko Mountains, I have not yet sufficient information to speak.

Cratægus, which, in eastern America, abounds with many species which are conspicuous features of vegetation in different parts of the country, is only represented in Japan by Cratægus chlorosaca, one of the black-fruited group related to Cratægus Douglasii of our Pacific states, which it much resembles. It is not rare in the neighborhood of Sapparo, where it grows near streams in low, wet soil, and apparently does not range south of Yezo. The flowers are not large, and as a garden-plant this species has little to recommend it.

The Saxifrage family, which is conspicuous in Japan with a large number of shrubs, including some which have become important features in our gardens, has only a single Japanese arborescent representative; this is the now well-known Hydrangea paniculata, which is one of the most common northern and mountain plants, and which occasionally in favorable situations, especially on the hills of central Yezo, becomes a tree twenty-five to thirty feet in height, with a short well-formed trunk a few inches in diameter and branches stout enough for a man to climb into. From the branches the Ainos make their pipes.

In the Witch-hazel family, Distylium racemosum, an evergreen tree of the southern islands and of southern China, with peculiar and exceedingly hard dark-colored, valuable wood, will require in this country the mild climate of the extreme southern states and of California. The Japanese Hamamelis, however, is already an inhabitant of our gardens, where, unlike the American species which flowers in the autumn, it produces its orange or wine-colored flowers in March. Hamamelis Japonica is one of the common forest-shrubs or small trees in its native country, where specimens occasionally occur thirty or forty feet in height, with stout straight trunks and broad, shapely heads. In the autumn the leaves turn bright, clear yellow; but on one form which we found on Mount Hakkoda, near Aomori, with small, thicker, often rounded leaves (Hamamelis arborescens of Hort., Veitch), they were conspicuous from their deep rich vinous red color. This may, perhaps, prove to be a second Japanese Witch-hazel.

We were fortunate in securing a good supply of ripe seeds of the little-known Disanthus cercidifolia of Maximowicz, a curious and interesting member of the Witch-hazel family, and abundant material, from which Mr. Faxon has made the drawing which is reproduced on page 215 of this issue. Disanthus, of which only one species is known, is a shrub with slender spreading branches, eight or ten feet high, stout terete red-brown branchlets conspicuously marked with pale lenticels and obtuse buds covered with chestnut-brown imbricated scales. The leaves are suborbicular, rounded and minutely mucronate at the apex, or rarely orbicular-ovate and sharp-pointed, cordate or rarely truncate at the base, entire, palmately five or seven nerved, dark blue-green on the upper surface, pale on the lower, thick and firm or ultimately sub-coriaceous, three or four inches long and broad, with reticulated veinlets and stout petioles one or two inches long and thickened at the base. In the autumn they turn deep vinous red or red and orange. The flowers appear in October, when the fruit developed from the flowers of the previous year ripens; they are dark purple, sessile, base to base, in two-flowered heads on slender-ridged peduncles produced from scaly buds, and are each surrounded by three thick ovate, obtuse woolly, closely imbricated bracts which form the apparent connective between the two flowers. The calyx is five-parted, the divisions imbricated in æstivation, ovate, obtuse, latitudinally unequal, reflexed, and much shorter than the five lanceolate, acute petals imbricated in æstivation, spreading into a star-shaped corolla and slightly incurved at the apex. The stamens are as long as the lobes of the calyx and are inserted on its base opposite the petals; the filaments are short and broad, as long as the anthers, which are nearly as broad as long, attached on the back, two-celled, extrorse, the cells opening longitudinally. The ovary is superior, ovate, compressed, two-celled, gradually contracted into two short spreading styles stigmatic at the apex; the ovules are numerous in each cell, suspended from its apex, anatropous. The fruit is a woody ovoid two-celled capsule, which opens loculicidally, with a thin cartilaginous inner coat separable from the thick hard outer covering. The seeds, of which there are a number in each cell, are ovate, acute, compressed, angled by mutual pressure, with a thick, hard, dark chestnut-brown lustrous coat, an oblong pale lateral hilum and thin albumen surrounding the terete embryo, with a long erect radicle and thick ovate cotyledons.

Disanthus cercidifolia† is not rare in the valley of the Kisogawa on the Nagasendo, in central Hondo, where it is occasionally found, covering steep hill-sides with thickets of at least a quarter of a mile in extent. In habit and in the autumn color of its leaves Disanthus is one of the most beautiful shrubs which I saw in Japan, and if it flourishes in our gardens it should prove one of the best plants of its class recently introduced into cultivation. *C. S. S.*

* Pyrus Miyabei.
Cratægus alnifolia, Siebold & Zuccarini, *Abhild. Acad. Münch.*, 1844, 130.—Regel, *Act. Hort. Petrop.*, i., 225.
Sorbus alnifolia, Miquel, *Ann. Mus. Lugd. Bat.*, i., 249 (1863).—Maximowicz, *Mél. Biol.*, ix., 173.—Wenzig, *Linnæa*, xxxiii., 61.
Aronia alnifolia, Decaisne, *Nov. Arch. Mus*, x., 100 (1871).

† Maximowicz, *Mél. Biol.*, vi., 21 (1866).

Foreign Correspondence.

Paris Letter.

THE establishment and spread of technical instruction in horticulture is quite a new feature of French educational life, although it is now advocated by all, and in many places pretty largely endowed by state or local authorities. The paramount importance of horticulture, as a wealth-producing industry, was not nearly as generally recognized as it is now, before the great progress made in the means of transportation gave rise to a large inland and

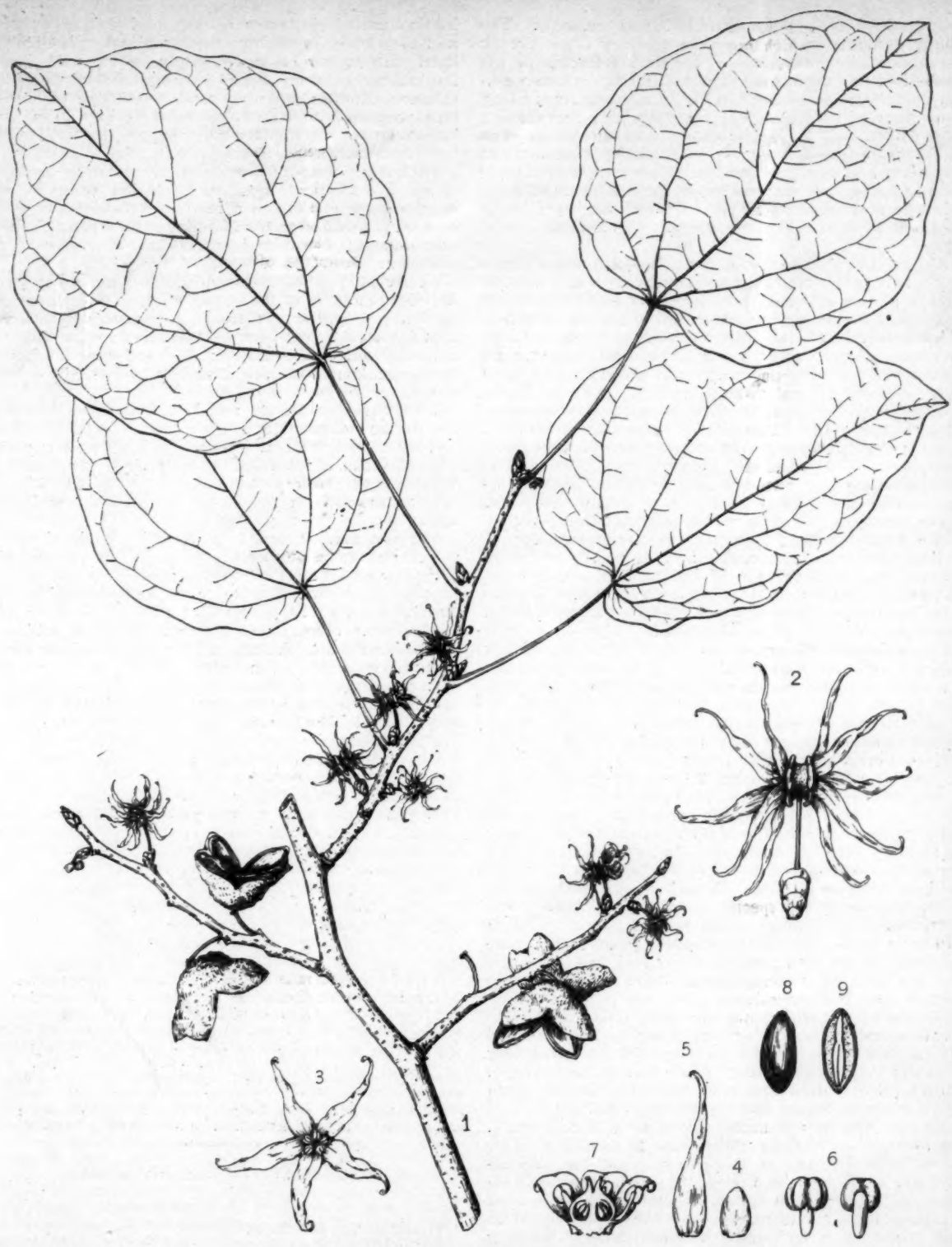

Fig. 33.—Disanthus cercidifolia.—See page 213.

1. A flowering and fruiting branch, natural size. 2. Side view of a flower-cluster, with peduncle and scaly-bud, showing the apparent connective composed of the closely imbricated bracts, enlarged. 3. Front view of a flower, enlarged. 4. A sepal, enlarged. 5. A petal, enlarged. 6. Front and rear views of a stamen, enlarged. 7. Vertical section of a flower, enlarged. 8. A seed, enlarged. 9. Vertical section of a seed, enlarged.

export traffic in fruit, vegetables and flowers, and before private and public statistics bore witness to the immense tonnage and great money value of horticultural produce of all kinds.

Up to the middle of the present century, and even later, all horticultural tuition was of the mutual kind. Experienced gardeners, whether in charge of the places of gentlemen and noblemen, or working independently for profit, used to take in their employ boys or young men as apprentices and teach them the rules of cultivation, pruning and

propagating, etc., both by word and example. The young gardener was promoted to a higher class of work as soon as he had mastered the first elements of his profession, till he was pronounced fit for filling a responsible situation, and to become in his turn the teacher of a new generation of gardeners. This system still prevails to a large extent, and it must be candidly admitted that, even in France, the greatest number of gardeners of the present day never had any other tuition. Only it is now eligible for any young man who thirsts after some share of more scientific and systematic knowledge of the profession to obtain it at a trifling expense and with very little loss of time.

Although it is very far from my thoughts to disparage in any way the practical tuition and experience which must be always at the bottom of professional education, it cannot be doubted that a more scientific instruction in all branches of horticulture is rendered necessary to high-class, and even to ordinary, gardeners by the discoveries made in all branches of scientific knowledge connected with horticulture. The recent progress in chemistry, in biology, in the knowledge of fungus and insect enemies of cultivated plants, while it very often explains and justifies the traditional practice of gardeners, has thrown so much light on many unexplained facts, and offers so many useful remedies to hitherto hopeless cases, that no reasonable aspirant to gardening excellence can afford to despise the aid of science.

The resources offered to the French student, in order to obtain some scientific knowledge of horticulture, may be divided into two distinct classes: 1. Organizations where horticulture comes in as a branch of general education, whatever its degree. 2. Organizations where horticulture is the main object, and other branches of knowledge an accessory.

Establishments where the teaching of horticulture forms part of the programme are very numerous, as a good many of the 80,000 primary schools of France are to be reckoned among them, many schools for girls even giving some sort of instruction in gardening as well as in housekeeping. Since 1850 the teaching of agriculture and of horticulture has become optional in all the primary schools. Masters who feel any taste for horticulture, or who consider it as useful to their own advancement to train their pupils in horticulture are at liberty to do so. Local authorities are generally in favor of horticultural as well as of agricultural teaching; they supply the necessary space for experiment and demonstration in the shape of a small garden or field. National and local societies of horticulture encourage the most successful masters by means of liberal awards of medals and premiums.

In most of the French Departments (which are territorial divisions smaller than the American states, but larger than the counties, and, to some extent, self-supporting) there exists a normal school, where the primary school-teachers are trained. In such schools agricultural and horticultural teaching was made compulsory by a law enacted in 1876, six years being granted as an adequate period for providing the necessary means of instruction. A course of agricultural and of horticultural training is actually given in the primary normal school, generally by the departmental professor of agriculture. It is, of course, the right way to begin the work by training the teacher first. This course, however, is not everywhere considered as compulsory, and often such men only attend it as consider it advisable to acquire some special knowledge of horticulture in view of their own pleasure or future advancement in their profession. Agricultural and horticultural teaching should have become general in primary schools three years after its establishment in the primary normal schools, but the measure too often failed on account of deficiency of money or in consequence of the difficulty of introducing fresh matter into programmes already crammed.

Last year Mr. Henry L. de Vilmorin, in a paper contributed to the *Revue Pédagogique*, showed that this difficulty might be avoided to a certain extent by selecting texts on horticultural subjects for reading and writing exercises, and even by giving arithmetical problems on horticultural data. He further insisted strongly on the usefulness of horticultural as distinguished from agricultural teaching in primary schools; some practical knowledge of horticulture promising to be of immediate utility to a much larger class of the pupils than purely agricultural instruction, the general hints as to gardening operations being to a much less extent influenced by the variable conditions of soil and climate. Besides, gardening being in most cases a mere addition to a man's resources better admits of limited proficiency than farming where a man, simply school-taught, would be, in more than nine cases out of ten, an unmixed failure.

Nearly all public bodies and authorities in France are decidedly in favor of the extension, both in number and efficiency, of horticultural teaching, considering that a well-kept garden is a very important addition to the welfare of a household, besides encouraging and maintaining domestic habits and exerting a healthy influence by open-air exercise.

The liberality of state and local authorities is mainly seen in the encouragement given to professional schools of horticulture, the number of which is increasing yearly. They are scientific and practical schools at the same time, emulating with more or less success the National School of Horticulture at Versailles, an account of which will be the object of another letter.

The fact that efficient horticultural schools should be practical is recognized by every one. It is doubtful if in any other profession the knowledge of things and of operations needs more forcible teaching by actual practice by the sight and handling of plants and tools than horticulture. Scientific data, apart from the subject of immediate application, are of little avail, and we cannot end this communication better than by quoting a passage of a letter from Professor Huxley on the subject of agricultural education recently referred to in the *Kew Bulletin*: "The story of a bean, of a grain of wheat, of a turnip, of a sheep, of a pig or of a cow, properly treated, with the introduction of the elements of chemistry, physiology and so on, as they come in, would give all the elementary science which is needed for the comprehension of the processes of agriculture in a form assimilated by the youthful mind, which loathes anything in the shape of long words and abstract notions, and small blame to it."

Paris. *H.*

Cultural Department.

Plant Breeding.

BREEDERS of animals aim to perpetuate qualities which are most desirable, and to combine those that are best in certain individuals, or to originate new ones, as well as to develop the finest strains by improved feeding, care and selection. Horticulturists are a long way behind in this matter. They have been content, for the most part, to take what they found growing wild, call it good, then patiently wait for more. If an attempt was made to produce varieties from seed it has usually been by sowing those from some popular sort which had been fertilized by the winds or insects, and accept the chance result as the best that could be had. Plant-growers possess the advantage of being able to distribute and perpetuate the life of the particular individual indefinitely. This is literally true only of plants propagated by buds, grafts, layers and the like, yet with those ordinarily propagated by seeds the seed reproduces the individual so closely that it is practically the same. Does it follow that since plant-growers are specially favored in this respect, they do not command the means of improvement which animal breeders have employed? W. O. Focke, the author of *Die Pflangen Mischlinge*, who is undoubtedly the best authority on the subject of crossing and hybridizing, while acknowledging the need of much more careful observation and experiment, has, nevertheless, been able to derive from his study many laws and generalizations concerning their behavior. And so far as practical experience goes, it indicates that seedlings properly bred are much more likely to prove valuable than those raised indiscriminately.

The Herstine Raspberry, the Saunders, Ruby and others were originated by D. W. Herstine, of Branchtown, near Philadelphia, from seed of the Allen planted next a row of Philadelphia, with the expectation that the product would be a cross between the two. Crossing may take place under such conditions, but there is no certainty of it, and the male parentage is at best wholly in doubt. Yet even such careless methods as these, as in this particular instance, have been productive of good results.

Another man who rendered most excellent service to American pomology was Dr. W. D. Brinckle, of Philadelphia, in the moments spared from a busy professional life. He began with Strawberries cultivated in pots and kept in the windows of his rooms; from those his attention was turned to Raspberries and Pears. He naturally worked from the standpoint of an amateur, and the Raspberry which bears his name is probably the best known of his productions. His experiments were confined to the foreign sorts, and seedlings of such parentage did not prove well adapted to our climate in hardiness and vigor, and yet the Brinckle's Orange up to the present day stands as the type of excellence in quality which is to be sought in a Raspberry.

This line of work is coming to be considered a matter of more and more importance at our experiment stations, but it is safe to say that it is never likely to receive as much attention as it deserves, because in most cases the results are slow, and we are apt to be engrossed in matters which yield a quicker return. Yet the possibilities of the field are unlimited, while the work itself is most fascinating for the lover of nature.

The advice of Marshall P. Wilder can hardly be repeated too often: "Plant the most mature and perfect seeds of the most hardy, vigorous and valuable varieties, and as a shorter process, insuring more certain and happy results, cross or hybridize your best fruits."

Suppose we take the genus Rubus and notice some of the desirable things to be sought for in it. In the Cuthbert we have the standard red Raspberry for the general and late crop; yet its canes are not entirely hardy, its color is a little too dark to be most attractive in market, and its quality is not the best. Can we raise from it, as one parent, a seedling which will possess its good qualities and improve it where deficient? The Golden Queen is but its counterpart, with yellow fruit of better quality, and this might improve in two respects. In Shaffer, of the Rubus neglectus type, we have probably the most productive Raspberry grown, on a vigorous bush, propagated from tips, with no annoyance from suckers, but the fruit is dull-colored and unattractive when ripe. Can we get a bright red berry of good quality on a bush of this character? I dare not answer no. In Black Caps it may seem that there is already improvement enough, yet with a fruit so new in cultivation this can hardly be true; and the newer introductions and seedlings, now on trial at the experiment stations, certainly show no indication of having reached the limit.

In Blackberries we want varieties with the hardiness and productiveness of Snyder, but of larger size and better quality. And who can yet predict the future of the Dewberry, which has so recently been introduced to gardens? May it not possess in its earliness, large size, or some other points, qualities which will unite with those of the upright Blackberry to produce a fruit better than either? The union is not an easy one to effect by crossing, and the species may be too far separated to produce offspring of value, yet it has been accomplished, and only time and continued trials can show what the outcome may be.

Cornell University. *Fred. W. Card.*

Fig. 34.—Mouth of Putnam's Wolf-den, Pomfret, Connecticut.—See page 212.

Spring Flowers.

IN this late spring season the display of the earliest spring flowers in the mixed border of hardy plants is still meagre. Among those which have appeared are some familiar flowers that peep out early each year and are the advance-guard of the season. They are always in bloom with the Crocus, which is a, perhaps, more definite statement than any dates, considering the difference in seasons and latitudes.

There appear to be, so far as I have noticed, but few hardy Primulas. The bright, early-flowering P. rosea once promised to be hardy, and has lived through our winters, but it has largely died out and is now seldom seen. P. denticulata, which was planted with P. rosea, has proved to be reliably hardy. Without any special care or protection, it comes up strong and flowers annually, along with the pure white form known as P. denticulata nivalis. The latter variety is snow-white and has been making an attractive display for some days past. This Primula likes a moist soil, with shade from midday sun. It thrives amazingly, making a strong growth after the flowering period. It is a native of the Himalayas.

A new Fritillaria, tried for the first time this season, is F. aurea. The figure given in Nicholson's *Dictionary of Gardening*, under this name, is evidently in error, as the segments of the flowers are shown recurved, as in F. recurva, while the flowers of F. aurea are the same shape and size as F. Meleagris. The ground color is clear yellow, checked with brown on the inside of the flowers. It is the prettiest Fritillary I know, and has proved perfectly hardy here, flowering a month earlier than F. Meleagris. It is of dwarfer habit, scarcely exceeding nine

inches, though a few tried in the greenhouse were twice the height of those in the open. The plant is a native of Asia Minor, and is offered by growers of bulbs in Holland. The flowers grown indoors lasted two weeks, and the colors were brighter than those in the open ground. Scarcely any two flowers are alike in the markings or tesseræ.

Puschkinia scilloides, the Striped Squill, is somewhat rare, and is similar to the Scillas. It is always among the earliest garden-plants to bloom. The segments are white, with a blue stripe down the centre of each. This pretty spring-flowering bulb once planted will appear every spring, requiring no special care.

The earliest Daffodils were in bloom here a week ago, and were the first flowers from the open garden useful for cutting. Of the many hundred bulbs in the borders, notwithstanding the severe winter, there are no breaks in the rows, and it is certain that in our climate severe cold does not injure them. Many kinds appeared above the soil last fall before the cold weather came, and they will flower as if nothing had happened to them.

South Lancaster, Mass. *E. O. Orpet.*

The Hardy-flower Garden.

OFTEN there are surprises in the garden. A few balmy, sunny days this week, after the cold and tiresome rains, seemingly transformed the plants. Everything caught the effect of the change at once, and, looking around one morning, it seemed at a glance as if every plant was ready to show its flowers.

In a hardy garden, planted to secure a succession of flowers, such a rapid change is apt to come as a shock, and one has to reflect if he realizes that, after all, everything will not flower at once, but the flowers of to-day will be followed till the late year by others as interesting, though, perhaps, by none as captivating, as those peculiar to the freshness of late winter and early spring.

This is the mid-season of the Narcissi and Tulips, and the beginning of the wealth of Irises, though the latter have been in some force ever since winter. Of the less well-known Narcissi, I note that Mrs. J. B. Camm is a beautiful Ajax, or large trumpet kind, with very light yellow trumpet and creamy perianths, a drooping flower, very soft in color. Seemingly very vigorous. John Nelson is an Ajax of very bright clear yellow, slightly lighter perianth and very distinct and satisfactory. Major Pyrnean seems to me much purer in color than the Major of the Dutch, and among the collected bulbs are found some beautiful double kinds with perfect trumpets filled with bright orange petals. One cannot go amiss on N. primulinus, although the colors vary somewhat. They have a distinctive character difficult to describe without a sketch. Of the Incomparabilis class there are many, to me not specially pleasing. There is only beauty of size, if that be beauty, in Sir Watkin. Barri Conspicuus is also disappointing, in spite of its orange-scarlet cup—the perianths are but feebly colored. C. J. Backhouse is with me much handsomer and clearer in color. Queen Bess is a smaller flower, with deep yellow spreading cup. Juno is one of star-like kinds, white cup and perianth. Of the Leedsi class, Minnie Hume is a gem with white wide perianth and light yellow spreading cup. Duchess of Brabrant is not so pure in color, but is pleasing and much cheaper. The gem of this section is Duchess of Westminster, which, at half a guinea a bulb, seems rather dear, though the Eucharis-shaped flowers are very charming and pure in color. Nelsonii Major and Pulchellus are distinct and good. Of the smaller-cupped kinds I like best the Burbidgeii varieties, which are dainty gems, with cups slightly longer than those of N. poeticus.

There is one other Narcissus which must be mentioned, N. Johnstoni, Queen of Spain, which has a character of its own, being distinctly saucy. The long yellow trumpet is nearly cylindrical, and the narrow perianth sections perfectly reflexed their entire length. Mine is not good ground for the increase of bulbs, but the Daffodils color very well, and I find them long-lived with any fair care, though needing attention if flowers are wanted. A lot which were planted so late last fall that they made no progress during the winter came into flower late with as few losses as if they had been planted earlier, though, of course, the flowers were scarcely up to form. As might have been expected, the greatest sufferers were the varieties of N. poeticus; this has the shortest resting period of any Daffodil.

The early dwarf Tulips are quite past their best, and though they have their uses, and some beauty, they are not comparable to the later tall-growing kinds, without which no garden is complete at this season. With all the beauty of the florist's Tulips, with their pure colors and well-rounded petals, I have a fancy for the wild kinds, with their sharp-pointed petals and less civilized colorings. T. Gregii, now in flower, for instance, is a species of most dazzling beauty, generally bright vermilion. The leaves, very much like those of a magnified Dog's-tooth Violet, are themselves very decorative. This species does not seem, however, certain to flower. I have one special bulb which has not flowered in five years. T. Orphanidea has a large burnt-orange flower. T. elegans, a very deep velvety crimson, and T. Schrenki, which is referred to T. Gesneriana, is splashed with light crimson on a white ground. This is very early. Of the other wildlings the very dwarf T. Cilicica, with its small carmine flowers, is very reliable in flower, and from its habit well adapted to a rockery.

Many Irises are well in bud, I. aphylla the first of the dwarfs to show its dark purple flowers. This is one of the best of the section, and apparently has been the subject of much attention from the botanists, as, according to Baker, it has a dozen synonyms—namely, nudicaulis, Bohemica, Hungarica, biflora, biflorens, furcata, falcata, Clusiana, Fieberi, rigida and subbiflora—which, besides being confusing, is a curious example of the plethora of botanical names found attached to plants. Though the plants thus referred to I. aphylla may be all botanically synonymous, there is evidently a difference among them as garden-plants, for reliable dealers quote four or five of them as distinct and at differing prices. In another way it will be seen that this is an instance where one can pursue an interesting experiment by collecting and testing the varieties with a certainty at least of dispensing some surplus.

Elizabeth, N. J. *J. N. Gerard.*

Roses.

THE quality of Tea-roses is now usually somewhat inferior as compared with the flowers of a month ago, the buds opening out before they have attained full size under the increased heat of the sun. There is also great liability to mildew; the temperature of the houses runs up fast, and the ventilation required to counteract the heat frequently results in a draught over the plants, with the almost inevitable consequence of an attack of mildew. This evil may be avoided to a great extent by beginning to air the house quite early in the morning and giving more ventilation gradually as it may be required, and by checking the fire at sunrise or soon after. During some seasons no artificial heat is required in a Rose-house by this time; with the thermometer frequently at forty-five degrees or lower, as during the late spring of this year, a little fire-heat is necessary to keep the plants in health.

Some late hybrids in pots are useful at this time; they require but little heat to bring them on now, and after having been brought into bud add much to the brightness of a conservatory. Mrs. John Laing, Eugenie Verdier, Prince Camille de Rohan, Countess of Oxford, Marie Baumann and Ulrich Brunner are excellent sorts for this purpose, and while several of these are also among the best for early forcing, all can be depended upon for spring blooming. More liberal treatment in the matter of top-dressing and the application of liquid manures may be given now than during the winter, as the growth of the plants is naturally more rapid, and they thus take up larger quantities of moisture and fertilizers. This is especially true of pot-plants. Tea-roses that have been in bloom during the winter, and are required for summer flowering, may be thinned out a little to dispose of the weak and worthless growth, and should then be encouraged to break into new growth by means of a top-dressing. There should also be syringing on every bright day with a good pressure of water, care being taken to get well under the foliage. The red spider gains a foothold easily under the influence of the hot sun, and is very difficult to dislodge when once established. A slight shade on the glass will improve the quality of the flowers considerably during the hot weather, but it is not well to shield them from the sun entirely. An easy way is to give the glass a thin sprinkling of naphtha and white-lead with a syringe.

All flowers required for the day should be cut early in the morning and put into cold water at once; if kept in water for twelve hours they will improve greatly in size and color, and will last much longer than if cut while the sun is high.

Young stock should all have been propagated before this time, in order to insure strong plants for the coming season; cuttings may still be rooted if necessary, but they will require to be kept a little closer now than earlier in the season, and must be watched to prevent their damping-off. Young Roses should not be allowed to become pot-bound, or a stunted growth will follow; these plants are gross feeders, and abstract the nourishment from the soil in a short time. Strong

and healthy young Roses from three-inch pots, with good roots, will often do better when planted out than larger stunted plants from four or five inch pots.

Eel-worms have been troublesome in some localities during the past winter; in some instances whole houses of promising young stock have been ruined; the only preventive measure against this insect is the thorough cooking of the soil before it is placed in the beds, quite a troublesome operation unless proper apparatus is provided. Some large trade-growers follow this plan, and have an arrangement of steam-pipes and an oven, and claim it to be a paying investment for them. An additional advantage of this baking of the soil is that the seeds of various weeds are destroyed in the process, so as to do away with the weeding of beds to a great extent.

Holmesburg, Pa. *W. H. Taplin.*

Correspondence.

The Re-appearance of Wild Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—The fear has sometimes been expressed in your columns that our best native flowers are in danger of extermination by the close-cropping and grazing of the meadows and the destruction of the woodlands. I have shared these fears myself, but of late years my opinion is considerably changed. The inherent power of nature to re-establish herself from the smallest possible beginnings, the power most seeds have of lying dormant for years under unfavorable conditions, only to spring quickly into growth when the conditions are improved, and the friendly aid of birds in their visits to inaccessible places where wild flowers yet linger, all these factors are favorable to the establishment and increase of wild flowers.

When we built here, something over seven years ago, the site was chosen for its beauty of location and for its fine grove. There were no flowers save the festive "Jimpson" and rollicksome Dog Fennel, that obligingly hemmed in the old shoes, battered tin-cans, beef-bones, skulls and other accumulations on this unfenced piece of ground in the suburbs of the village. Our town is too small to enforce stock laws, and for nearly forty years hogs had rooted, cattle grazed and horses tramped over this ground at their will. Our only hope for native flowers was to bring them to our grounds from the distant hills.

The first spring after we came to Oak Lawn, one weak little Violet appeared, together with a few stunted Erythroniums, possibly a dozen sorry specimens in the whole grove, one small cluster of the beautiful bulbous flower, Camassia Fraseri, a starved wild Rose or two, and several sturdy plants of Ipomœa pandurata, Wild Smilax, Clematis viorna, Passiflora lutea and Pentstemon lævigatus, var. Digitalis, that no amount of abuse could kill. It will be noticed that, with the exception of the Pentstemon, all these last-named are vines, indicating that our climbing plants have more than an even chance of existence in the struggle for life over other herbaceous plants. It was interesting to see how these plants responded to our care. The weak little Violet grew lustily and scattered its seeds far and wide; to-day its progeny is numbered by scores, if not by hundreds. The same can be said of the Erythronium, which, not content with the woodland, has begun to surprise us on the lawn, in the paths and in the flower-beds. The pretty nodding flowers appear so very early, and the low, broad, mottled foliage is so striking, we do not count them usurpers, but gladly welcome them. The Camassias, with every care, have increased but slowly, but the clump is now a large one, and the blossoms, at a distance, appear like a soft blue cloud resting on the green grass. As for the other plants mentioned, they increased so rapidly that considerable weeding has to be done every year to keep them within bounds.

But this is not all. In another year the advance-guard of Wild Asters began to appear, accompanied by a new Pentstemon lævigatus, the purple Milk-weed (Asclepias purpurescens), and Lobelia leptostachys. Two fine Junipers came up that year, in just such places as we should have chosen had we been planting them. They were, doubtless, planted by the birds, which are never molested in our grove, and which come in great numbers. Two years later, or four years after our taking possession of the grove, there appeared a fine specimen of the purple Cone-flower (Echinacea angustifolia) in our shrubbery border. The next year two important additions appeared, a plant each of Dodecatheon Meadia and Sabbatia angularis, both beautiful flowers. A little visitor unluckily pulled up the Dodecatheon for its pretty blossom. The Sabbatia, in spite of its tempting pink blooms, was allowed to seed. In two years' time plants of this species dot a quarter of the grove. Last year another Sabbatia made its appearance, this time in the middle of a bed of Tea-roses. It grew wonderfully in the loose, rich soil, and during the entire midsummer was a solid sheet of clear, rose-pink blossoms, generally admired, although not recognized as a wild flower. Last year, seven years after our coming, in a low corner of the grove several plants of Lobelia syphilitica came up, to our surprise. We begin to think that anything is liable to make its appearance in the most unexpected place, not excepting plants which we thought entirely exterminated. If an asylum is provided for our oppressed wild plants they seem certain to find it out, and to appear of their own accord.

Pineville, Mo. *Lora S. La Mance.*

Recent Publications.

Celery for Profit. By T. Greiner. W. Atlee Burpee, Philadelphia.

This little handbook, although it contains less than a hundred pages, tells the amateur planter in the plainest possible manner all that he needs to know in order to grow a crop of Celery in his home-garden, and then how to preserve it properly through the winter. Perhaps the most interesting chapter is that devoted to the "new celery culture," which consists in growing the plants so closely together that they blanch in their own shade. This is not altogether a new idea; it was suggested years ago, but Mr. Greiner shows how it can be made uniformly successful. The two essential conditions for growing the plants so closely are (1) enough plant-food and (2) enough water to get this food ready for the roots. Of course, if a square rod of ground is to grow as much Celery as is generally grown on four or five rods, the land must contain four or five times as much available food. There is little danger of having the ground too rich, and if no better arrangements are made for irrigation the plants must be watered by hand. This plan will answer for two or three hundred plants for home use, but it will be a back-aching contract for some one if a larger number of plants are cultivated. Still, even in very considerable fields where Celery is raised for market, Mr. Greiner shows how easy it is to arrange some scheme of systematic irrigation.

In the new culture it is advised to set out two or three hundred plants of White Plume Celery, in late May or early June, on thoroughly fertilized and well-prepared ground, in short rows ten inches apart, with plants five inches apart in the row. If there are more than eight rows a central one should be left vacant to give a pathway through the bed for watering. To bleach the outside rows each bed is enclosed in boards eight or twelve inches long, set on edge and held in position by stakes. The surface should be kept well stirred for a few weeks after the plants are set out, and in the early season they usually need no water. They will soon cover the ground and choke out the weeds, which will be done more surely if a mulch of fine compost, some inches thick, is placed between the rows soon after the plants are set out. Unless there are continual and heavy rains the ground must be soaked once every five or ten days. Water should be applied directly to the ground between the rows, flooding rather than sprinkling. By the first of August, or even earlier, the crop will be available for use and three hundred plants will give a good supply for an ordinary family. In July make another bed with a few plants of White Plume for early use and the main crop of Giant Pascal, New Rose and other good non-bleaching sorts. Since the late crop makes its growth during the period of abundant rainfall, artificial watering is not always needed, but it will be in most cases beneficial to soak the ground occasionally, even if the weather is not dry. For the market-gardener, Mr. Greiner explains how to cultivate the crops on a large scale, how to prepare the product for market and how to make the business profitable, and he gives full directions for fighting the Parsley worm, the slug, the rust, the blight and other enemies.

Notes.

The largest yield of oranges at Pomona, California, this year, was from a grove of trees seventeen years old. Six acres yielded 3,500 boxes. Two trees yielded thirty-five boxes.

A White Oak was lately cut near Shenandoah Junction, West Virginia, which made three logs whose continuous length was thirty-six feet, the diameter of the largest one at the butt being seventy inches, while the smallest end of the smallest log measured forty-two inches across.

We have seen a flower of one of the so-called Yellow Callas (Richardia aurata), which has just been brought to this office,

and its color seems rather disappointing. It can be hardly called a yellow, but is rather a pale primrose, with a dark wine-colored spot at the bottom of the spathe on the inside. The spathe is very solid and waxy in texture and the foliage is spotted with white.

Among the large Chestnut-trees whose dimensions we have lately seen on record is one in Middle Smithfield township, Pennsylvania, the trunk of which measures nineteen feet in circumference breast-high. The tree looks perfectly sound and bears a fine crop of nuts every year.

Just now the bud-scales of the Shell-bark Hickory, which grow to a considerable size before they fall away, have a delicate color which can scarcely be described in words. The true leaves are just appearing, but these scales in young and thrifty trees are sometimes three or four inches long and nearly half as wide, with a golden tint quite similar to that of some of the Cypripediums, especially those which contain the blood of C. insigne.

Strawberries are just beginning to come from Maryland to this market, but the abundance of these southern berries has no effect on the price of choice hot-house berries from New Jersey, which are still worth a dollar a small cup. New tamarinds are selling for twenty cents a pound, and the first limes in the market, some of them hardly half-grown, are twenty-five cents a dozen. The orange known as King of Siam, a beautiful fruit resembling a Tangarine orange in form and quality, but larger, commands a dollar a dozen. Good hot-house peaches are seventy-five cents apiece.

Central Texas seems to enjoy the honor of possessing the most western forest of Pinus Tæda. Forty years ago the hills of Bastrop County were covered with this Pine, and the forest extended to some of the neighboring counties. There was much lumbering carried on there before the war, and large fortunes were founded upon its profits, for the Pine-lumber used at San Antonio and other cities in the south-west part of the state came from this region. Our correspondent, Mr. Plank, writes that the hills of the county are everywhere still covered with Pine-trees, although those large enough for lumber have disappeared long ago. The people have been wise in allowing the younger ones to remain.

A correspondent of the London *Garden* speaks highly of three comparatively new Daffodils now blooming in Kew Gardens. One is Glory of Leyden, with a flower larger even than that of Emperor, and a pale trumpet of rich and decided shade which contrasts well with the soft yellow perianth. Besides this massive flower it has robust foliage and is a free grower. The second is Madame De Graaf, another kind of vigorous growth with pale sulphur-colored trumpet and a white perianth. Gloria Mundi is the third, with yellow perianth and a cup flushed with orange-scarlet. These plants are still expensive, but they are all vigorous, and it is probable that they will multiply so rapidly that they can soon be found in every collection.

Mr. J. G. Baker writes to the last number of the *Gardeners' Chronicle* of some of the new plants which have lately come from western Asia, from which region the horticultural world is receiving so many spring-flowering bulbs. The first of these is a Snowdrop (Galanthus Ikariæ) with the bright broad green leaves of G. Fosteri and the crisp edges of its inner segments, like G. Elwesii. The next is a new species of Oncocyclus Iris (I. Bismarckiana), which was introduced two or three years ago from the Lebanon country, but which Mr. Baker has just seen in flower. The outer segments are dark brown, with a yellow groundwork, the inner segments very pale, so that there is a great contrast in color between the rows. The third is a new Scilla from the mountains of western Persia which resembles some of the Hyacinths of the sub-genus Bellevallia, but the segments of the flower are free down to the base. It is dwarf, with small glaucous leaves and bright purple flowers tipped with green. The last is a new Fritillaria (F. Whittalli), which closely resembles the English F. Meleagris.

Writing in the April *Bulletin of the Torrey Botanical Club*, Mr. Arthur Hollick describes the recent discovery, in a cretaceous formation at Glen Cove, Long Island, of the leaf of a hitherto unknown fossil Palm which he has called Serenopsis Kempii. "The significance of this discovery, from the geological standpoint," he says, "need not here receive more than brief mention. . . . It is sufficient to say that the other fossil leaves associated with it show the geological horizon to be the equivalent of the Amboy clays of New Jersey and other middle cretaceous strata in America and Europe, from none of which have Palms been definitely recorded. The specimen in question evidently belongs with the tribe Corypheæ, and its nearest living allies are to be looked for in the genera Trithrinax, Copernicia, Thrinax or Serenæa (Sabal). The imperfect condition of our specimen does not admit of accurate comparison, but there seems to be but little doubt that it is allied to this group, and as we find associated with it leaves of trees which demonstrate that they were the ancestors of our living Liriodendron, Platanus, Sassafras, etc., we are certainly within the bounds of reason when we infer that we have here one of the ancestors of our southern Palmetto, as I have indicated in the generic name. The specific name has been adopted in honor of Professor James F. Kemp, of Columbia College, to whom the credit for finding the specimen is due." Two pictures of the leaf accompany Mr. Hollick's article.

A recent bulletin of the California Experiment Station gives a chemical analysis of several California fruits in order to show their richness in the different elements, and also to show which of the soil ingredients are most drawn upon by an ordinary crop. In flesh-forming ingredients—that is, in albuminoid contents—the figs rate first, with little choice between apricots and plums for the second, and prunes and oranges nearly equal for the third place. Apparently, the nectarine falls short of the above fruits in these ingredients, but it still ranges higher than apples and pears, if European data are accepted as correct regarding the latter fruits. In the analysis of some of the food constituents of cured fruits—that is, of dried commercial prunes, apricots, grapes and figs—it seems that the grape contains twenty per cent. more sugar than the apricot or apple, and twelve per cent. more than the French prune. In the quantity of mineral matter withdrawn from the soil it is found that the European estimates cannot be safely used for California fruit. Grapes take the lead in this particular, but oranges do not stand in the second place, as they do in Europe. The fig follows close after the grape, with the orange third, and the prune, apricot and plum in the fourth place. Among pitted fruits in California the apricot leads in its demand upon the soil for nitrogen, and therefore this should be liberally applied, especially in southern California soils, which are not rich in their natural supply of this element. Phosphoric acid, too, is only found in limited quantities in California soils, and therefore orchards of Prunes, Oranges and Apricots will require phosphoric fertilizers among the first. Potash is the leading ash ingredient, making fully three-fifths of the ash in the case of prunes and apricots, and one-half of the ash in the orange. California lands, however, are naturally so well stocked with available potash that the supply will probably be adequate for many years.

In a recent issue of *The Garden*, Professor Michael Foster, whose knowledge of Irises and of their cultivation is unrivaled, contributes an exhaustive and most interesting paper upon the Oncocyclus group of the genus, of which the well-known Mourning Iris (I. Susiana) is the type. The paper is too long to reproduce entirely, but, as Max Leichtlin and Professor Foster himself have raised several hybrids from this group, his views upon their fertility are interesting to cultivators who may wish to experiment in raising seedlings or hybrids. "The striking features," he says, "of an Oncocyclus Iris, the large flower, so out of proportion to the scanty foliage, the conspicuous coloration, the boldness of the marking, as seen, for instance, in the intense color of the 'signal' patch on the fall, the manner in which the anther is covered over and hidden by the curved style, all these and other features tell us very clearly that the flower needs the intervention of some insect to secure fertilization. From the frequent occurrence of seed-pods on imported rhizomes, I am led to infer that in its native home an Oncocyclus Iris goes to seed freely; and further, from the condition of imported roots, strengthened by the behavior of the plants cultivated in this country, I am also inclined to believe that the life of an individual rhizome is not a very long one, and that the race is largely continued by seeding. Here in this country plants left to themselves do not seed freely. But this is due not to the coldness of our climate, but to the absence of the proper fertilizing insects. Our bees, accustomed to more sober flowers, appear frightened at the strange aspect of an Oncocyclus Iris; at least I have never, so far as I remember, seen one of these Irises visited by a bee or other insect. On the other hand, if the flower be artificially fertilized, it goes to seed with great readiness. I think I may say that I am more sure of getting seed from an Oncocyclus Iris than from almost any of the ordinary bearded Irises. They cross readily with each other, and hybrids may be without any great difficulty obtained between them and the ordinary bearded Irises."